Tropical Products Institute

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An illustrated guide to fish preparation

FISH TECHNOLOGY C.F.T.R.I. 183 MANGALORE

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An illustrated guide to fish preparation

J. F. Rogers, R. C. Cole and J. D. Smith,* with photographs by J. O. Barron

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June 1975

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Ministry of Overseas Development

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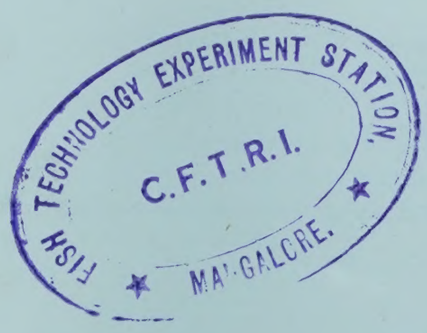

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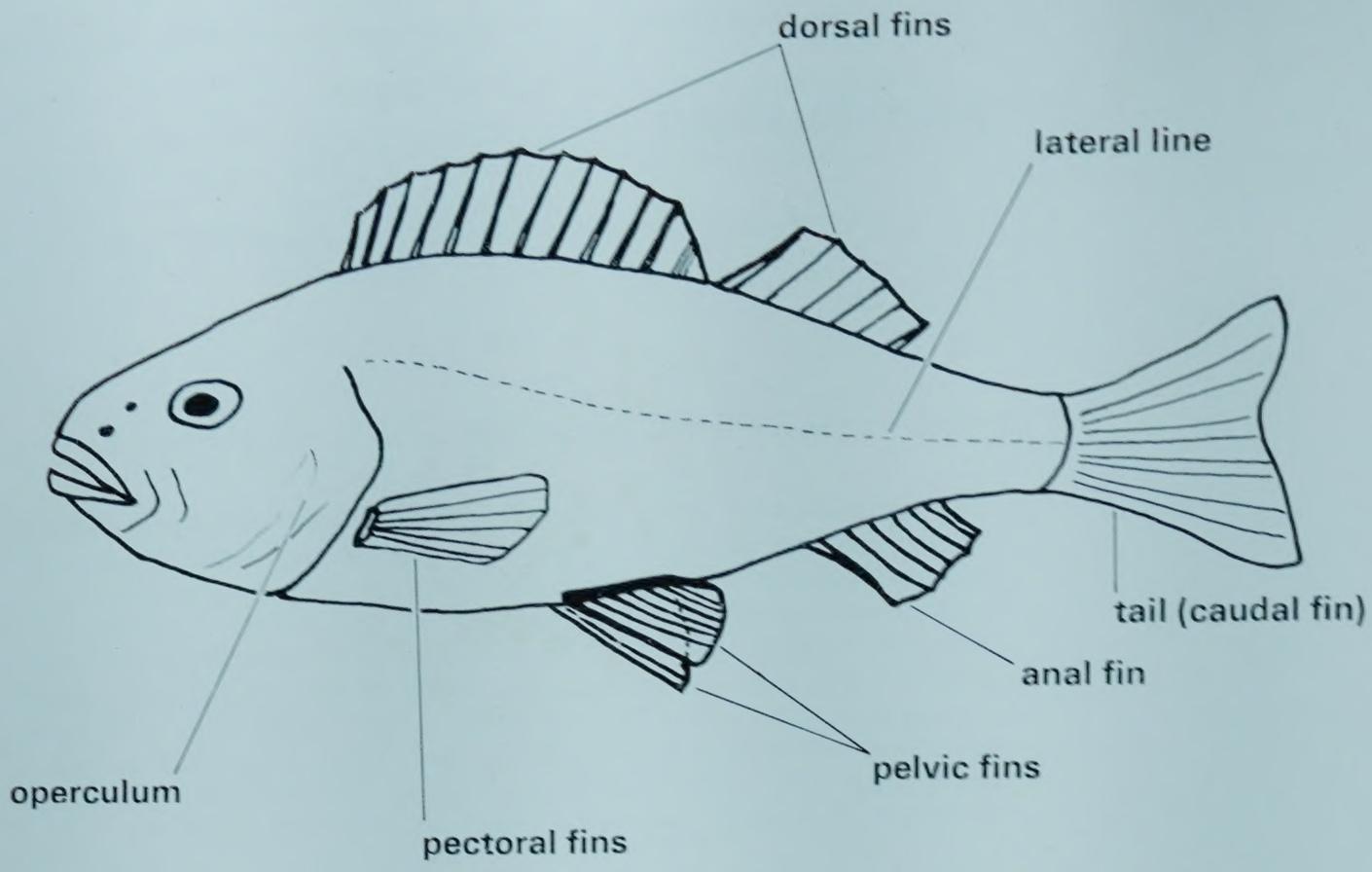
The advice and comment of various members of staff of the Tropical Products Institute is gratefully acknowledged.

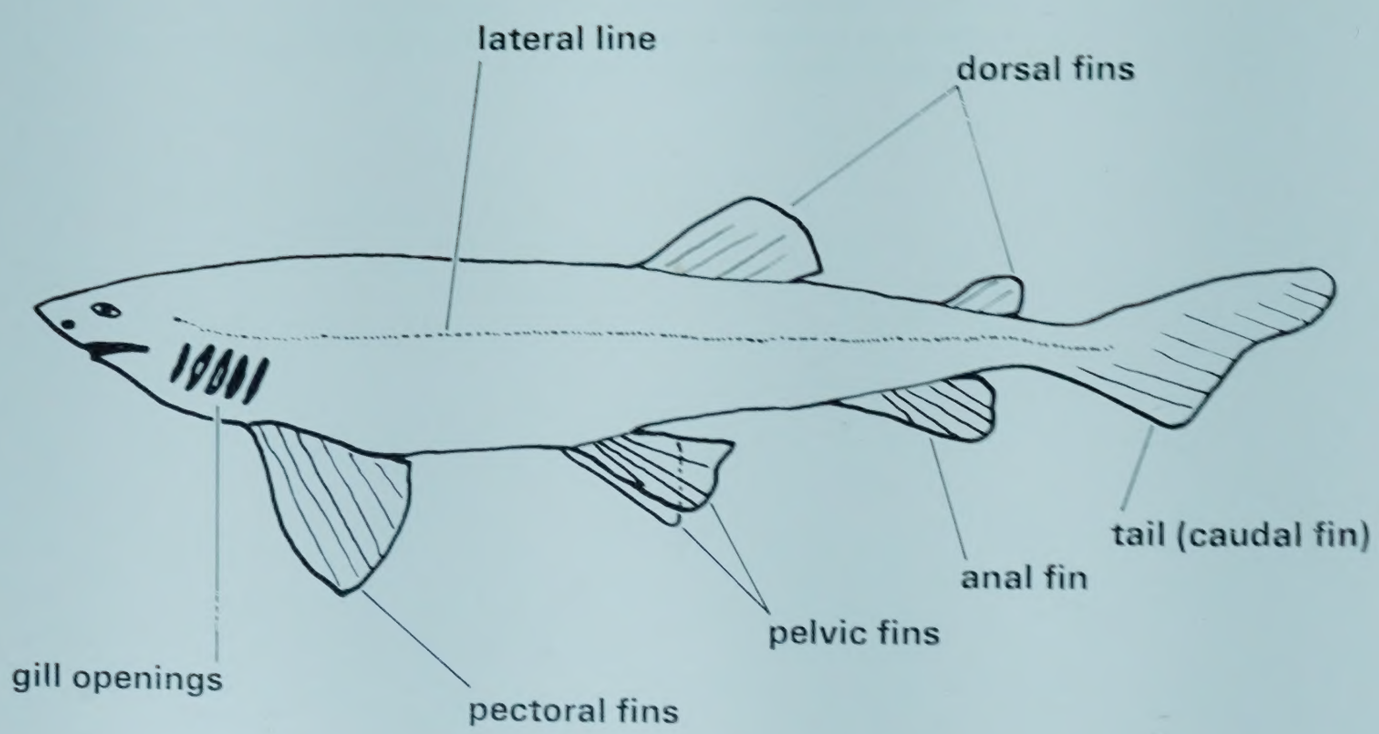
Introduction

The preparation of wet fish for the retail market or subsequent processing is becoming more important as fisheries are developed, and as markets far from the point of landing are supplied with fish. The efficient preparation of fish is important if top quality, maximum yields and highest possible profits are to be achieved. This is particularly true where the fish is to be sold in an export market. Efficient fish preparation is a skill which can only be acquired with practice. In a guide such as this, it is only possible to indicate methods for dealing with the basic types of fish landed in most commercial fisheries. The species here have been selected to illustrate a variety of fish types and shapes. With other species, the methods may require some modification to allow for differences in shape, and for market preferences.

Very often, several perfectly acceptable methods for cutting any fish will exist, these may often give the same yield and similar end products. Whilst no claim is made that the methods illustrated are better than any other, they will produce satisfactory results as regards yield and speed.
This guide has been devised for use in fisheries training institutions in developing countries where fish processing industries are being established or developed, and where there is a consequent demand for skilled labour. In the less intensified fisheries, it is also becoming necessary for field extension workers to have a practical understanding of fish preparation so that they can demonstrate improved techniques to the smaller fishing communities. As the guide is intended primarily for training purposes in developing countries, where English may not be a main language, numerous photographs have been used to illustrate each stage of the cutting sequences, and the text kept to a minimum.

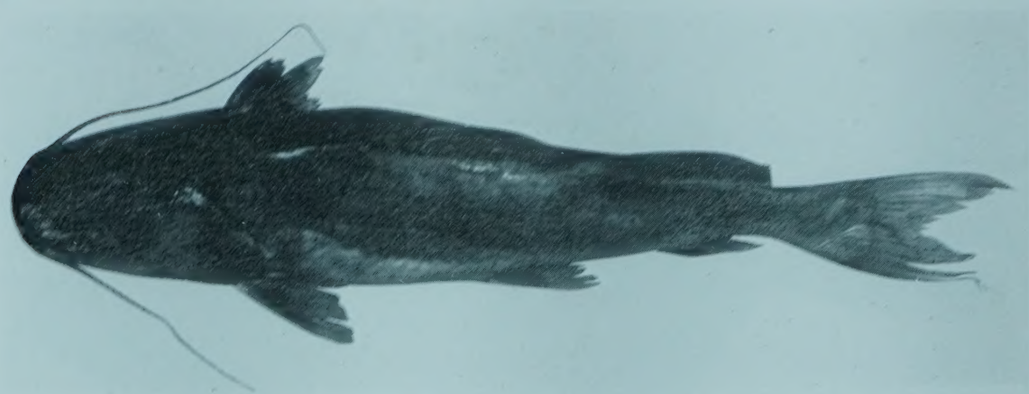


A Generalised Bony Fish

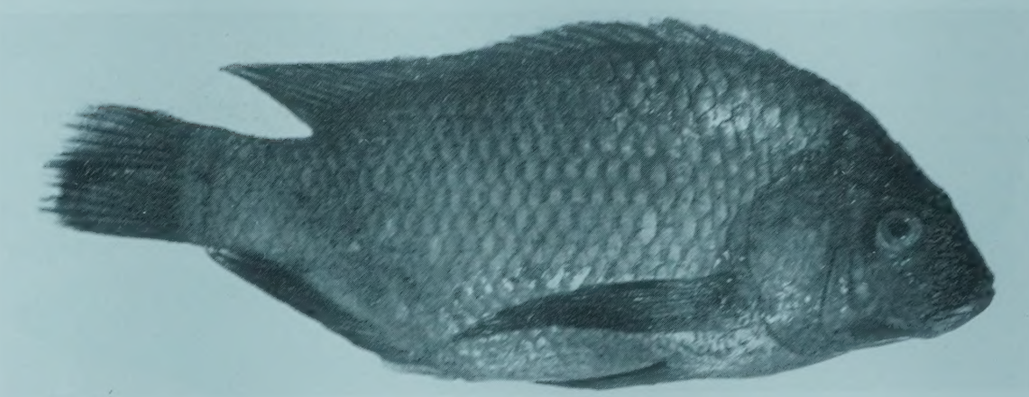


An Elasmobranch Fish

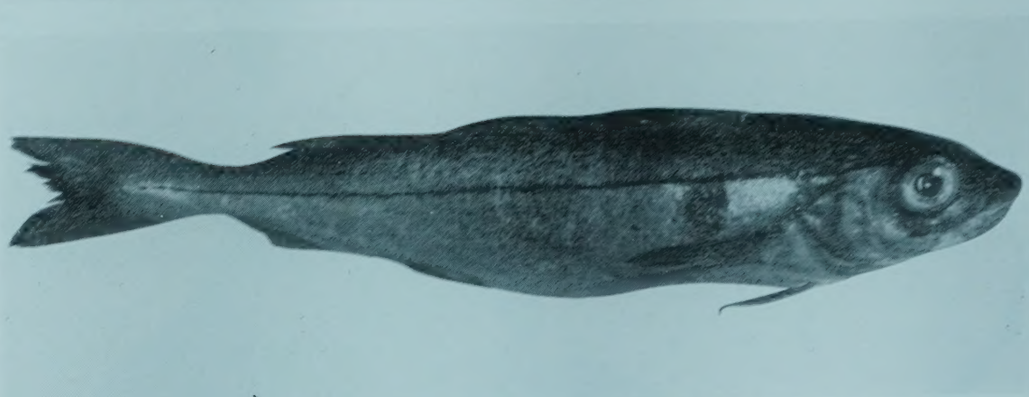
Fish types



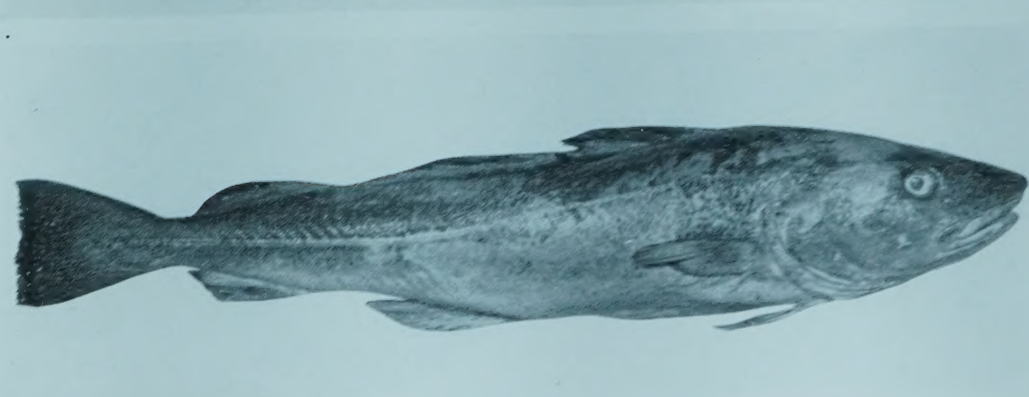
1 A Freshwater Catfish.
Bagrus docmac



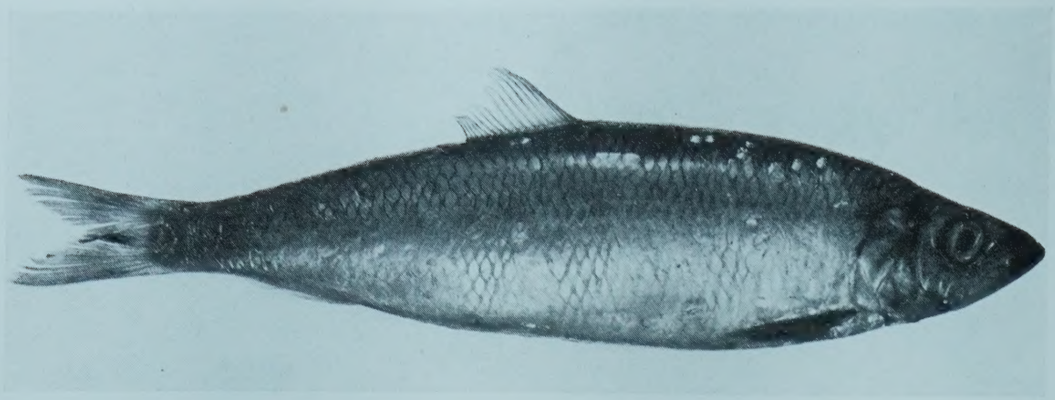
2 A Deep Bodied Fish.
Tilapia esculenta



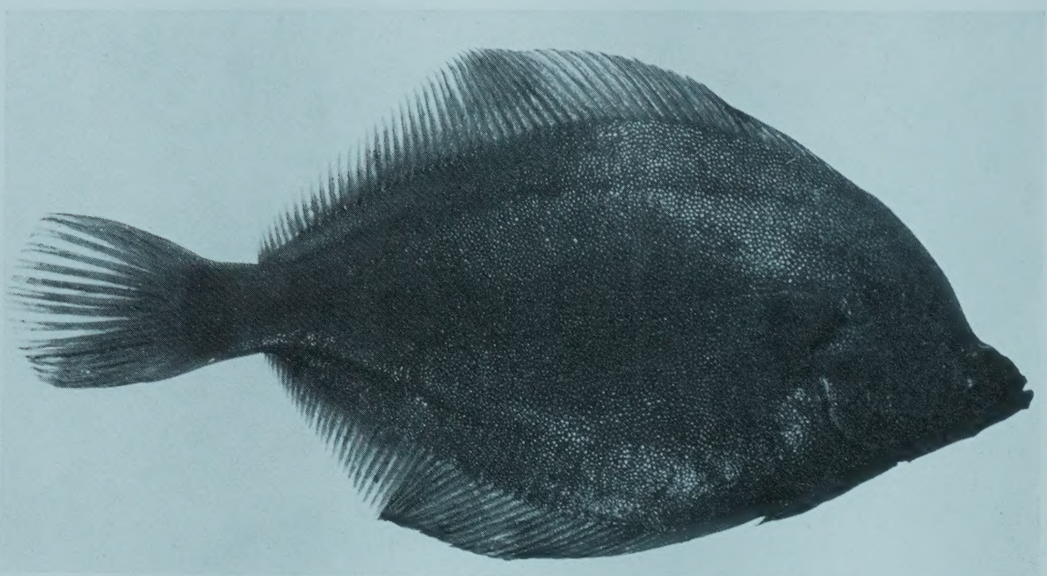
3 A Round Bodied
Marine Fish.
Haddock—*Melanogram-*
mus aeglifinus



4 A Round Bodied
Marine Fish.
Cod—*Gadus morhua*

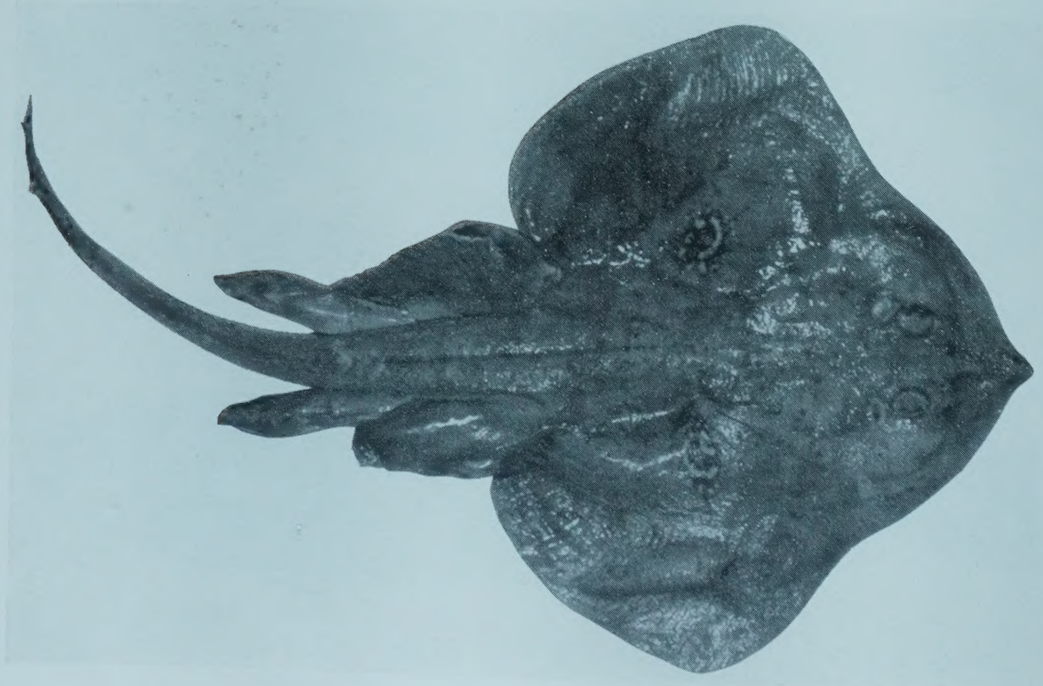


5 An Oily Soft Fleshed Marine Fish.
Herring—*Clupea harengus*



6 A Flattened Bony Fish.
Plaice—*Pleuronectes platessa*

7 A Small Shark.
Spur Dogfish—*Squalus acanthius*



8 A Flattened Elasmobranch Fish.
Thornback Ray—*Raja clavata*

Glossary

Defined below are technical terms commonly used in the fishing industry, many of which are used in this guide.
The list is restricted as more comprehensive multilingual publications on fish and fish products are available. Meanings of any particular term may vary in different parts of the world.

Air bladder (Also called swim bladder, gas bladder, maw and sound) Found in some Bony Fish. Gas filled sac lying beneath backbone and used for buoyancy regulation. Bladder of some species can be eaten or used for the manufacture of isinglass.

Belly flap That part of a fillet formed from the body wall, very often cut away from the fillet as it tends to discolour on storage with some species.

Boned Fish Flesh from which the major bones have been removed, i.e. a fillet may contain some rib and pin bones, but it is often described as boned.

Boneless fish Flesh with all bones removed.

Bony Fish (teleosts) Group of fishes with hard bones.

Brine A solution of salt (sodium chloride) in water.

Candling Inspection of fillets against a strongly lighted background to detect worms in the flesh. Fish is sometimes caught that contains large numbers of coiled worms in the flesh that, although harmless to humans, may not be acceptable to consumers.

Chilled Term used to describe fish held at or just above the freezing point of water (0°C, 32°F).

Dressed fish Fish ready prepared for cooking, or special preparation to improve presentation.

Elasmobranch fishes Skeleton of cartilaginous (soft) material (e.g. sharks and rays).

Fillet Strip of flesh cut parallel to line of backbone.

Block Fillet (butterfly fillet, cutlet, double fillet) Flesh from both sides of a single fish, usually joined along back.

Cross-Cut Fillet Fillets from flat fish, the flesh from each side is removed as a single piece.

Quarter-Cut Fillets Fillets from flat fish, the flesh from each side is taken off in two pieces.

Single Fillet Flesh from one side of fish.

Fish

Flat Fish Bony fishes of the order Heterosomata (e.g. plaice, flounder, halibut) ; laterally flattened fish.

Fresh Fish Fish that show no signs of spoilage. Fish preserved by chilling (marketing term).

Round Fish Fish that are roughly circular in section, (UK). Ungutted fish (USA).

Wet Fish Fish in ice, from a chill store or thawed frozen fish.

Whole Fish Ungutted fish (USA). Frozen, gutted fish (UK).

Gibbing The process of removing gut, stomach and gills by inserting a knife at the gills.

Gills Respiratory (breathing) organs.

Gonads Reproductive organs.

Guts Viscera, intestines or entrails (synonyms).

Gutted (*cleaned*) Fish from which the guts have been removed.

Heading Removing the head.

Lug Bones (*lugs*) Bone (Cleithrum) of pectoral girdle often left in split fish to provide support for subsequent smoking.

Milt (*soft roe*) Gonads from male fish.

Naping Cutting through flesh between head and belly prior to gutting.

Single Naping Cutting through belly wall on one side only.

Double Naping Cutting through both sides of belly wall.

Nobbing Removal of head and gut by partially cutting through the head and pulling it away, together with the attached gut.

Offal Remains of fish, including guts, after flesh has been removed.

Operculum Bony flap covering gill chamber.

Pectoral Girdle Bones supporting pectoral fins.

Pelvic Girdle Bones supporting pelvic fins.

Pin Bones Small bones (epi-pleural ribs) growing laterally from the backbone near the head. Often cut through when removing fillets. They may or may not be cut away from fillet later.

Ribs Bones surrounding the body cavity.

Roe Female gonads. Roe can also be used as a more general term, in which case hard roe is applied to the female gonads, and soft roe to male gonads.

Salting Putting fish in salt or brine.

Scaling Removal of scales, but not the skin.

Skinning The removal of the skin.

Splitting Cutting open fish from head to tail, often done prior to salting or drying. The head may or may not be removed.

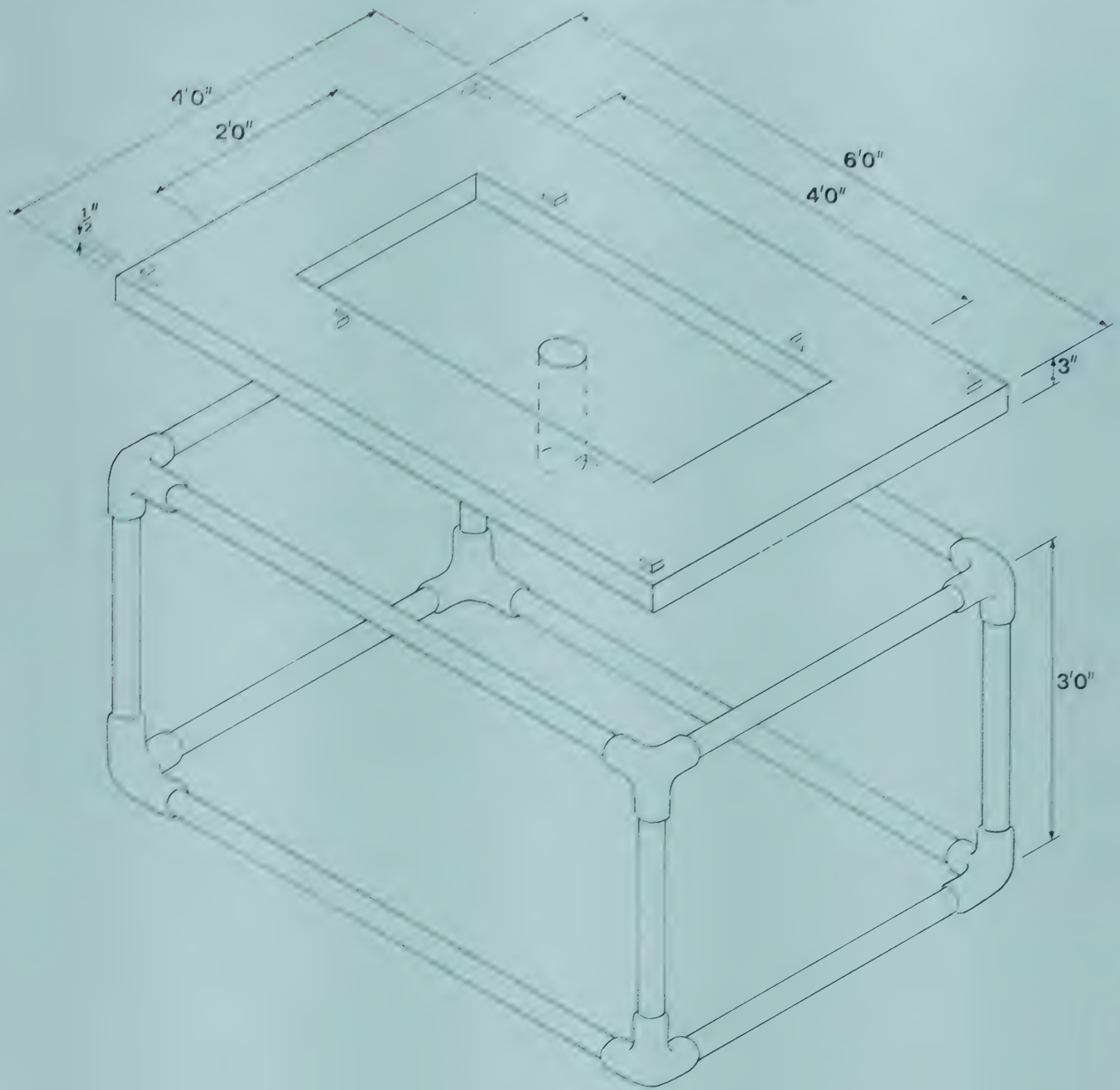
Steak Slice of fish cut at right-angles across the backbone.

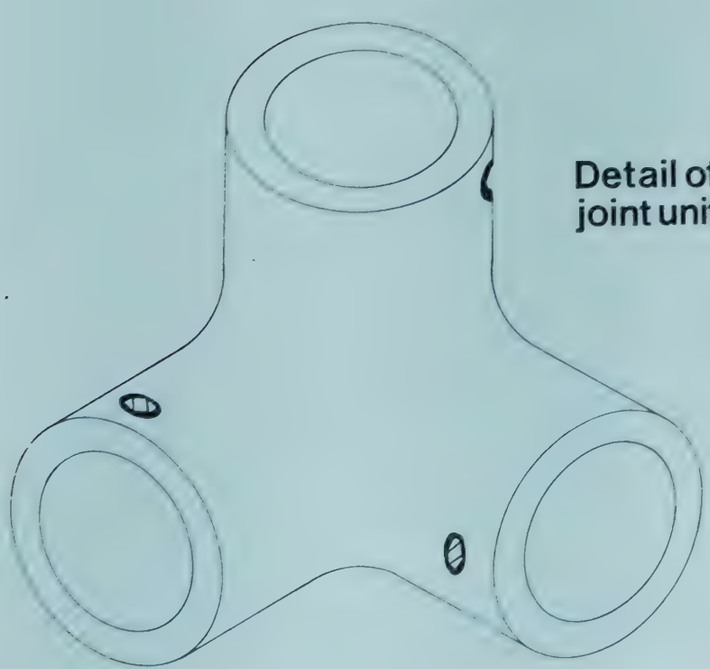
Vent External opening of the alimentary canal and reproductive organs.

Wing Edible part of the body of rays (flattened elasmobranch fishes e.g. skates and rays).

The fish filleting table shown opposite is recommended. The stainless steel top is supported on a frame made from galvanised steel tubing (approx. 2 inches outside diameter) fastened with 'Kee Klamp' connectors. In a permanent installation it may be preferable to fix the legs of the frame into the floor, in which case the bottom four connectors and lengths of pipe are not necessary.

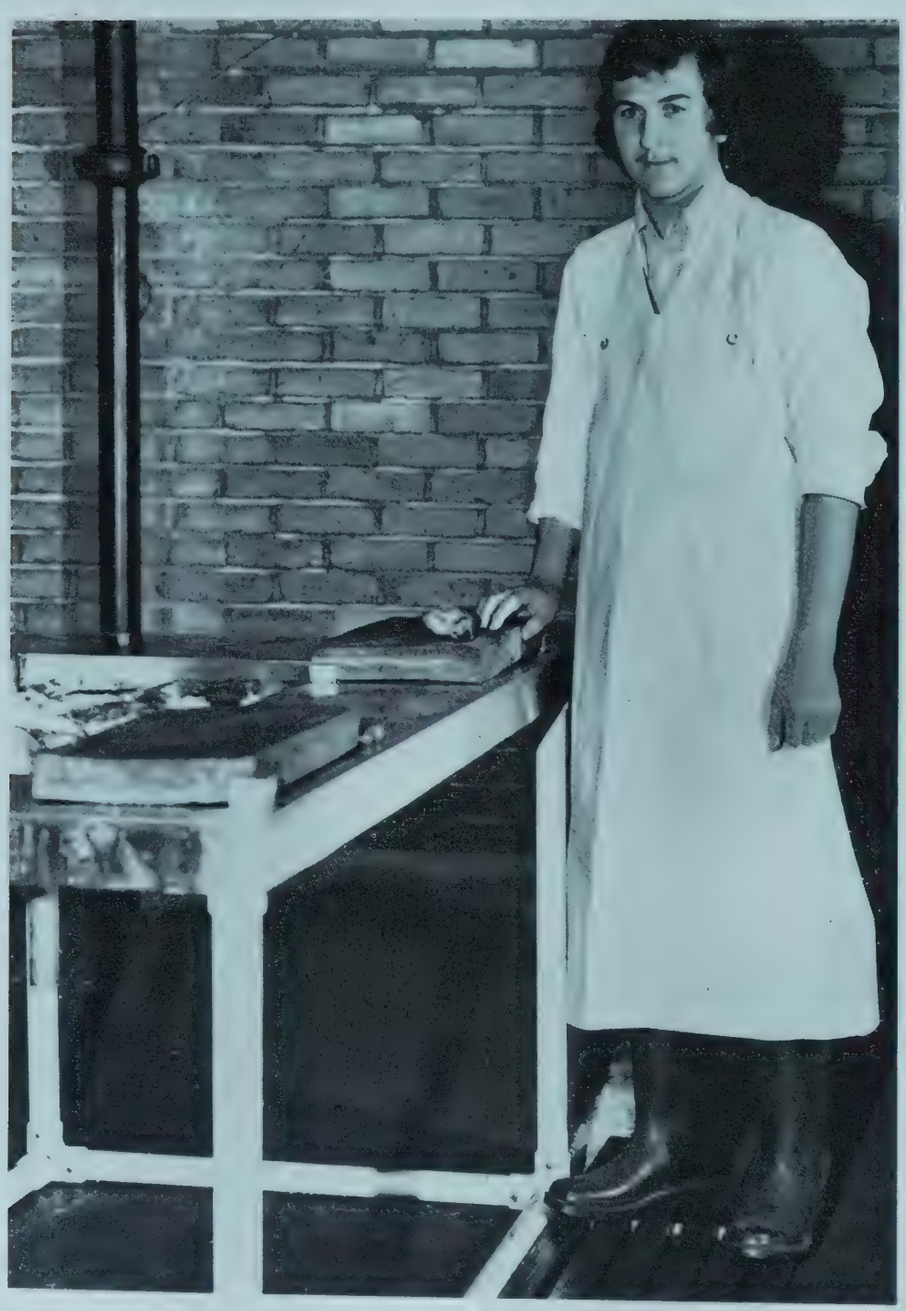
Fish Filleting Table





Detail of 'Kee Klamp' joint unit

9.1 Oilstone (in protective box).
2) Filleting
3 (or Skinning
4) Knives
5 Block Fillet Knife
6 Kippering (Herring Splitting) Knife
7 Gutting Knife
8 Cod Splitting Knife
9) Large Broad-
10 (bladed Knives
11 Steel



10 Protective Clothing.

Equipment

Knives are the basic tools for fish preparation, and the photograph illustrates a range of knives commonly used. Filleting knives are normally long and thin-bladed (2, 3, and 4). A particularly thin-bladed knife is an advantage for skinning fillets, very often a worn filleting knife is used. Block fillets are cut with a shorter, straight-edged knife (5). Herring are split with a short, pointed, broad-bladed knife (6), the knife used for block fillets is also suitable for splitting herring. The larger, broad-bladed knives are used for general cutting, fin removal and splitting (9, 10). Cod are split using a heavy, broad-bladed straight edged knife (8) ; extra weight is added to the knife by means of lead fixed to the base of the blade. This heavy knife is required to chop through the backbone. The short, broad-bladed, round-ended knife is used for gutting (7). Folding knives (clasp or pocket knives) are used at sea because they are safer.

Knives are sharpened in two stages ; firstly the knife is ground on a wet rotary grindstone, or on an oilstone (1), to produce a correctly angled and profiled edge to the blade. The final sharpening is done with a steel (11), which is also used to keep the edge on the knife whilst working. It is only necessary to re-grind a knife very occasionally. A steel is round or oval in cross section with very fine sharp ridges on its surface, it should not be a round file, which is far too coarse for producing a sharp, smooth edge to a knife.

Cutting operations should be carried out on a wood or composition board, to protect the knife and to stop fish sliding around on the work surface. Composition boards are preferred as they are more easily cleaned than wood, which holds bacteria. However, they are more expensive and may not be easily obtained in many countries.

Filleting tables should be constructed with aluminium or stainless steel working surfaces : it is important that they should be easily cleaned, and they should be designed with ease of cleaning in mind. The centre of the table should be lower than the working surfaces and it should have drainage holes. This is an advantage for holding fish and washing to remove ice and excess slime or dirt from the fish before cutting. Fish should be packed and transported in boxes to keep it clean and prevent unnecessary mechanical damage and handling. Prepared fish should be packed into suitable containers as soon as possible. At all times fish should be kept adequately chilled to reduce deterioration, this is particularly important at tropical temperatures. Construction of the frame supporting the table-top can be by any convenient method using available local materials.

Protective clothing must be worn when preparing fish, to prevent soiling of operative's clothing and to reduce contamination of the fish, from the operative's clothing. Rubberised aprons and boots as illustrated are suitable. Rubber boots are uncomfortable to wear for any length of time in tropical climates, and they can be dispensed with. If there are large quantities of ice and cold water, rubber boots will be necessary for the comfort of the operatives. It is convenient for operatives to be raised slightly above the floor level, and slatted duck boards, as illustrated, can be used. Caps to prevent hair falling on to the fish should be worn at all times by people handling fish being packed for retail distribution.

Hygiene

It is essential that fish is at all times kept as clean as possible, and the discussion below outlines general principles and lays down some basic rules for a code of practice (see appendix 2).

Bacterial contamination of fish flesh is a major cause of spoilage and if flesh is contaminated by pathogenic bacteria, it can cause serious illness, or even death, amongst consumers. If fish is kept clean and at chill temperatures, contamination is kept to a minimum, and the growth of any bacteria that are on the fish reduced.

Fish should at all times be handled with care to prevent physical damage (fish flesh is very easily bruised), it should be clean, and kept clean. Wet fish should be at chill temperature, and should be shielded from direct sunlight, particularly in the tropics, where ambient temperatures are high, and the sun is very hot. Fish deteriorates very rapidly at high temperatures.

Cleanliness is required at every stage of fish handling and preparation. All working surfaces must be made from materials which do not soak up water : they should be cleaned daily. Similarly, all equipment and tools must be kept clean. Personal hygiene of staff is essential, and adequate washing facilities, including the provision of soap, brushes and clean towels should be available and used before commencing work, after handling any contaminated materials, and after going to the lavatory.

Metal working surfaces, sinks, etc., are preferable, as are composition cutting boards, wooden cutting boards of a suitable non-resinous hard wood are permissible, but additional care should be taken to ensure their cleanliness. Floors should be water-proof and well drained.

At the end of each working day, all surfaces should be thoroughly washed down with a suitable detergent. The handling fish receives before and during preparation will affect the quality of the final product. Fish should be kept in boxes or similar containers : it should not be piled on the floor, nor should it be thrown around or walked over.

A supply of water fit for drinking must be available, whenever possible it should be chlorinated (see appendix 1 and 2). Fish should be washed in running water whenever possible, but where facilities do not permit this, washing water should be changed frequently.

Cut fish are more liable to bacterial contamination than whole fish and tools and equipment must be clean. Fillets should be processed or packed and chilled immediately after preparation.

Filleting a freshwater catfish

Bagrus docmac

Fishes of the family *Bagridae* are found in fresh water in many tropical countries. The species illustrated was obtained from Lake Victoria, East Africa.

The first four photographs show a standard technique for gutting round-bodied fish. Firstly the throat is cut and then the body cavity is opened by cutting down the belly wall to the vent.

As the specimen illustrated was fairly large, a head-off filleting technique is demonstrated. Fillet and belly flap were separated as belly flap tissue may discolour on subsequent storage and its removal leaves a fillet of attractive appearance and suitable size for retailing. In many developing countries the head and belly flap would find a ready sale on the subsistence market and a fillet would command a much higher price on the luxury market.

11 Cut across throat.

12 Cut down belly towards vent.

13 Remove internal organs (guts).

14 Cleaned body cavity. N.B. All kidney tissue adhering to backbone has been removed.

15 Remove head by cutting behind pectoral fins down to the backbone on either side of the fish.

16 Break off head over the edge of the bench, finish with a knife if necessary.

17 Remove pelvic fins.

18 Cut along line of dorsal fin towards tail to the end of the ribs.

19 Push knife through fish and cut off complete fillet down to the tail.

20 Turn fish on to belly Cut down from back on to the ribs. It requires a series of small cuts to clear all flesh from the ribs.

21 Cut belly flap away from fillet.

22 Turn fish on to its side. Cut from tail forward along the line of the dorsal fins.

23 Slide knife through at the end of the rib cage and cut away the tail section of the fillet.

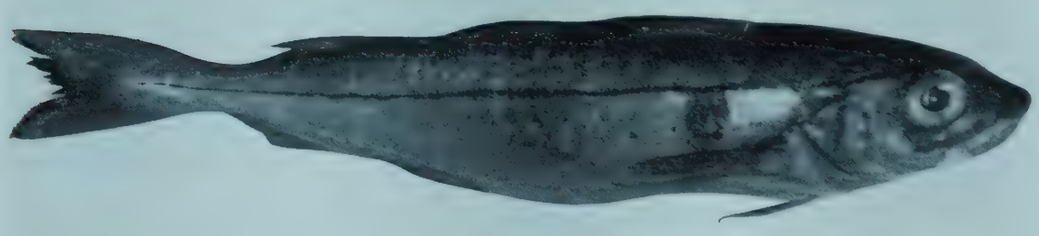
24 Turn fish on to belly. Cut away remainder of fillet from rib bones. Cut off belly flap and trim as necessary.

25 Carcase and fillets.

Filleting and splitting a round-bodied fish

Haddock: *Melanogrammus aeglefinus*

Single and block filleting techniques are illustrated together with the skinning technique for single fillets. Block fillets are very often cut from small fish where single fillets would not be of a useable size. A head-off splitting technique for producing a finnan haddock (brined and smoked) is also shown. The finnan can be split by cutting on either side of the backbone. The 'London Cut', split on the left hand side of the backbone, is illustrated.



Haddock—
Single fillets

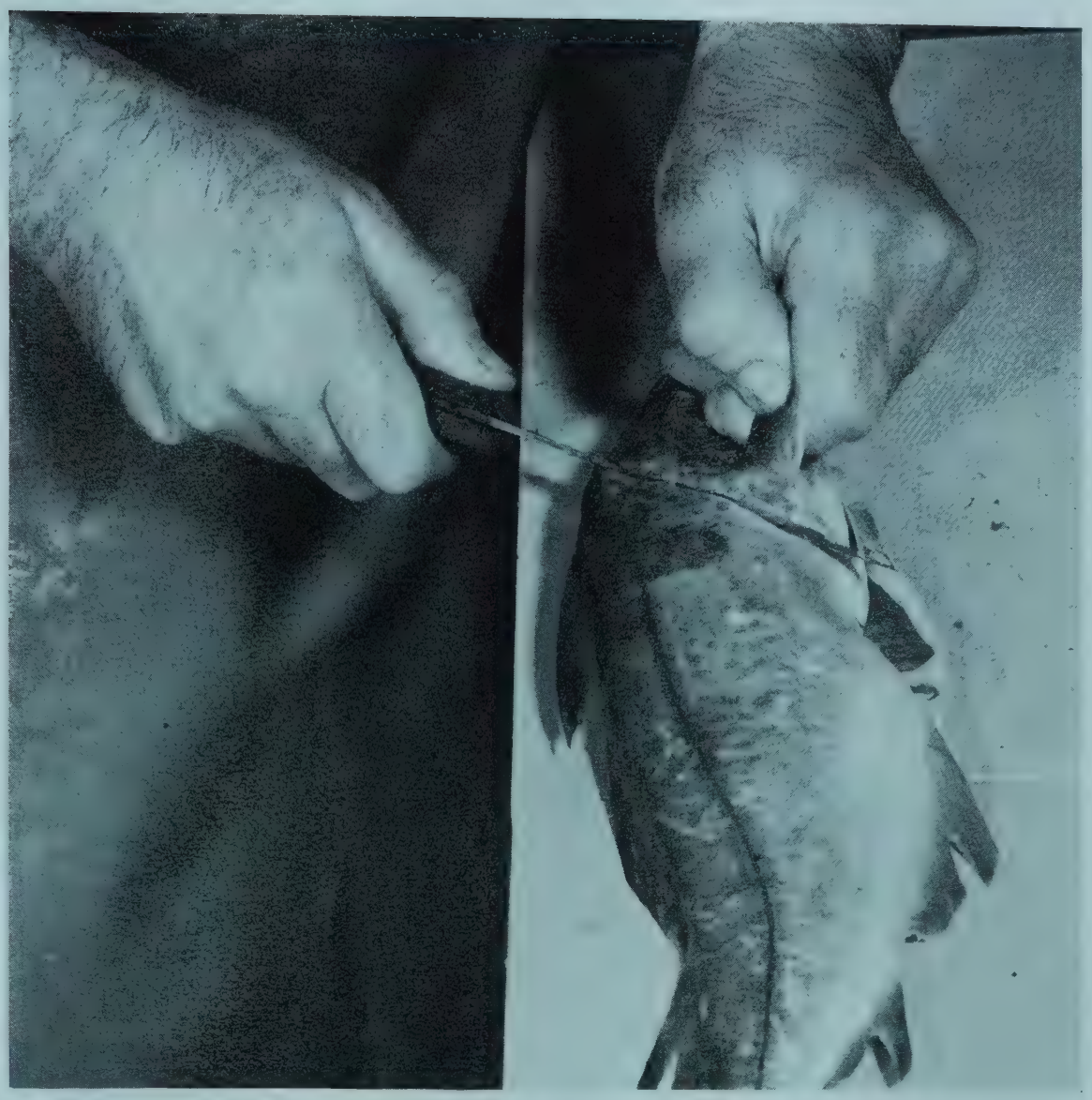
26 Lay fish on side. Cut from just behind base of pectoral fin round the back of the head.

27 Cut towards tail along the line of the dorsal fin, the cut should only penetrate as far as the backbone.

28 Cut forward to clear fillet from ribs. The knife should be held parallel to the rib bones, cut through the 'pin' bones.

29 Cut over the edge of the ribs towards the tail, flatten knife on to the back-bone after finishing cutting over the ribs and remove fillet. The fillet should be trimmed to remove any belly flap or fin (the belly flap tends to discolour with storage)

N.B. The 'pin' bones can be removed by making a V notched cut in the fillet.



30 Turn fish over. Cut just behind base of pectoral fin and round the back of the head.

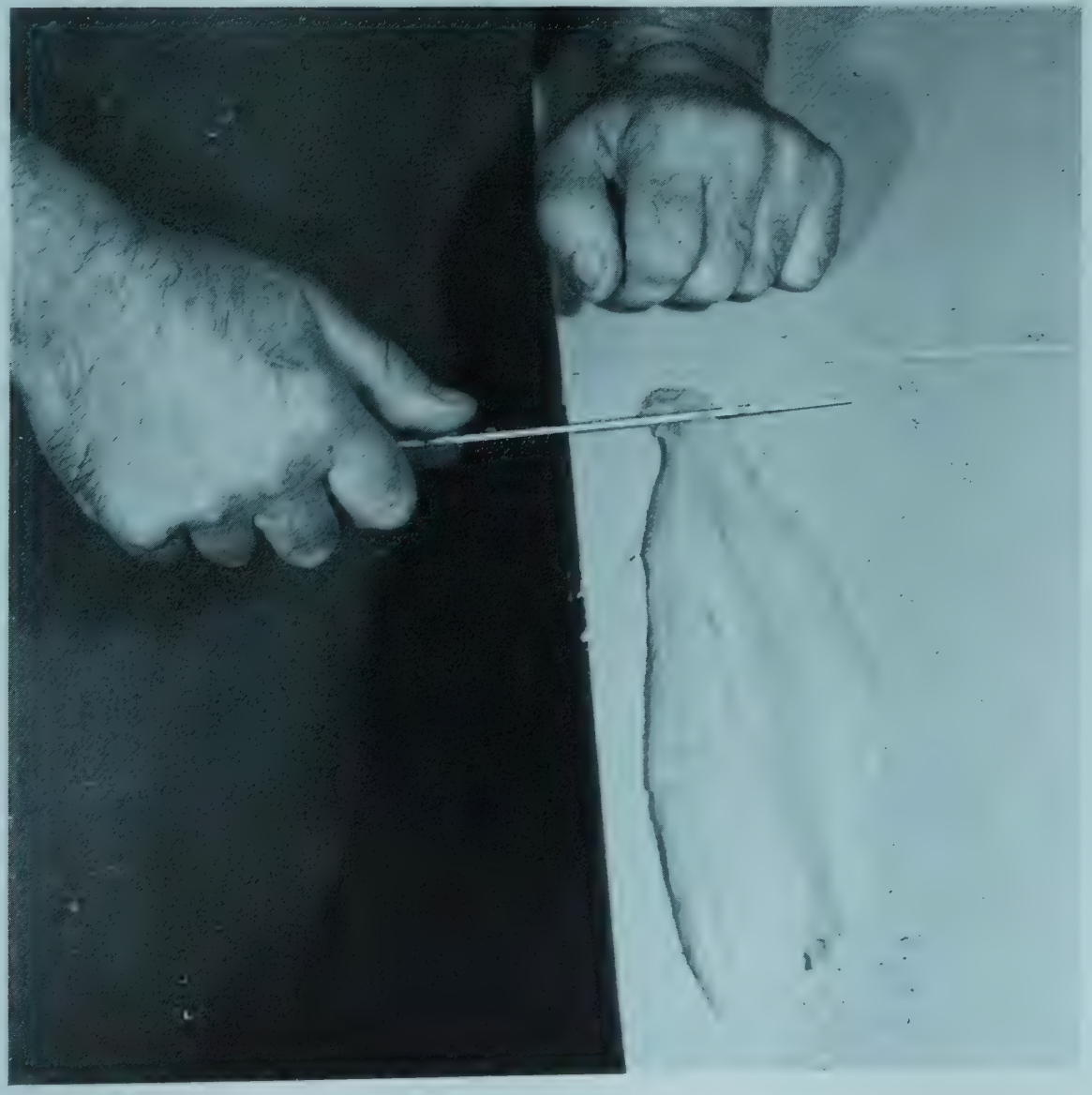
31 Cut from tail as close to backbone as possible into the corner at the back of the neck. Note the angle at which the head is held, this keeps the backbone flat on the board.

32 Cut forward parallel to angle of rib bones, cutting through the 'pin' bones and open out fillet.

33 Cut from behind head over the ends of ribs towards tail, knife should be held at an angle to remove flesh from the centre of fish without cutting off fins. On large fish two cuts may be required if a short-bladed knife is used. Trim fillet to remove any belly flap or fin

34 Two fillets and carcase.

Haddock—
Skinning single fillets



35 Cut nick in tail of fillet. Do not remove knife. Use a thin-bladed knife, longer than the width of the fillet.

36 Angle knife slightly downwards, pull the skin across the knife whilst at the same time making slight saw cutting movements with the knife. This technique is difficult and requires practice.

37 Fillet with skin removed. Note that the skin has been removed cleanly and that it has no pieces of flesh adhering to it.

Haddock – Block fillets

38 Cut from the back of the head to the base of the pectoral fins.

39 Note the position of the hand holding the fish. Turn the knife sharply (almost at 90°), otherwise it will stick in the rib bones and cut parallel to the angle of the rib bones.

40 Flatten knife over backbone and continue cut to tail. Do not cut through skin along back of fish.

41 Cutting towards the tail open out the fillet, cut close to, but not through, the skin.

42 Turn fish over, ensuring backbone is flat on board. Cut from back of head to base of pectoral fin. Note the angle at which the head is held.

43 Turn knife sharply to clear ribs and cut along the line of the ribs towards the tail. The knife goes right through and the point should just touch the board.

44 Continue to the tail and remove the block fillet.

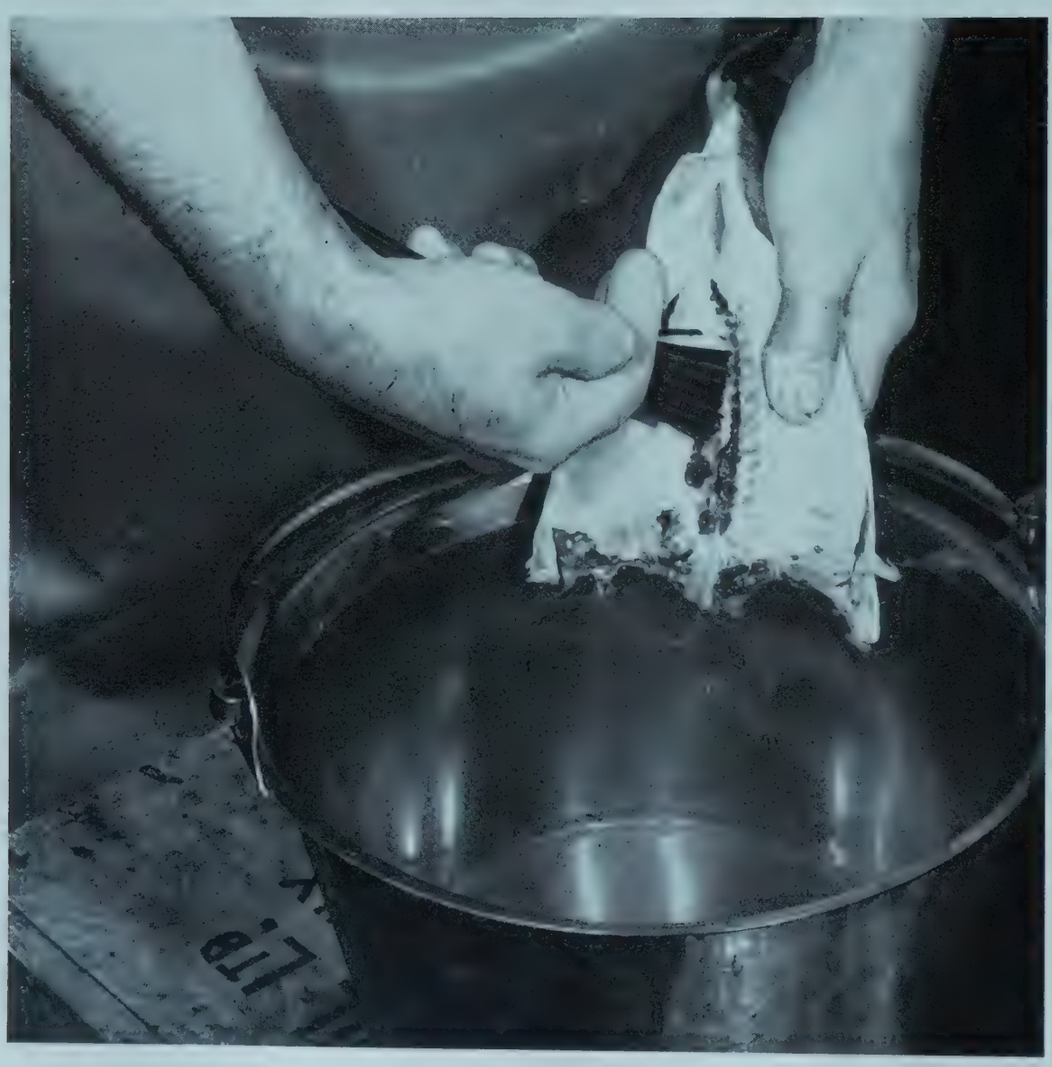
45 Fillet and carcase. Block fillets can be skinned by the technique used for single fillets. Care must be taken to keep the fillet flat on the cutting board and the tail must be held firmly to prevent the fillet splitting up the mid-line. The dorsal fins must be removed before filleting if it is intended to skin block fillets.

Finnan Haddock

46 Cut off head. Do not remove pectoral girdle (lug) bones as these are required to hang the split fish for smok ng.

47 Open body cavity completely, cutting beyond vent.

48 Clean out body cavity, removing peritoneum (the thin black membrane), swim bladder and all kidney tissue. A small brush made from a tuft of stiff bristles is particularly suitable for cleaning the kidney tissue adhering to the backbone.



49 Using the brush to remove kidney tissue.

50 Cleaned fish.

51 Cut beneath ribs down to backbone.

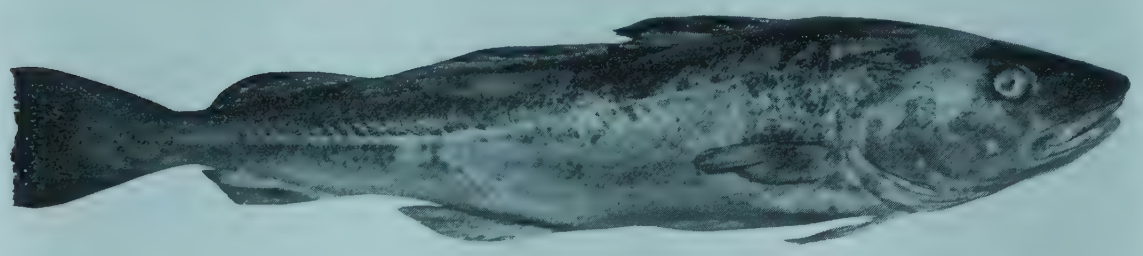
52 Make a second cut down the centre line of the fish and cut open the flesh beneath the bone, do not cut through the skin.

53 Completed Finnan Cut Haddock.
A cut may be made at the base of the backbone to allow blood to drain out; this prevents discolouration during storage. A high pressure water supply connected to a hollow needle may be used to wash blood out of the backbone.

Splitting a large round-bodied fish for salting and drying

Cod : *Gadus morhua*

The splitting technique illustrated may be particularly applicable to other similarly shaped species in developing countries where salted dried fish finds a ready market. Small cod may be filleted by the normal single or block filleting techniques. Large cod can be filleted head-off for ease of handling.



Cod splitting

54 Hold fish across barrel and cut the throat. Do not cut the lug bones out as they are necessary to hang the fish for drying.

55 Turn fish over and cut into back of head down to backbone, break off head into barrel.

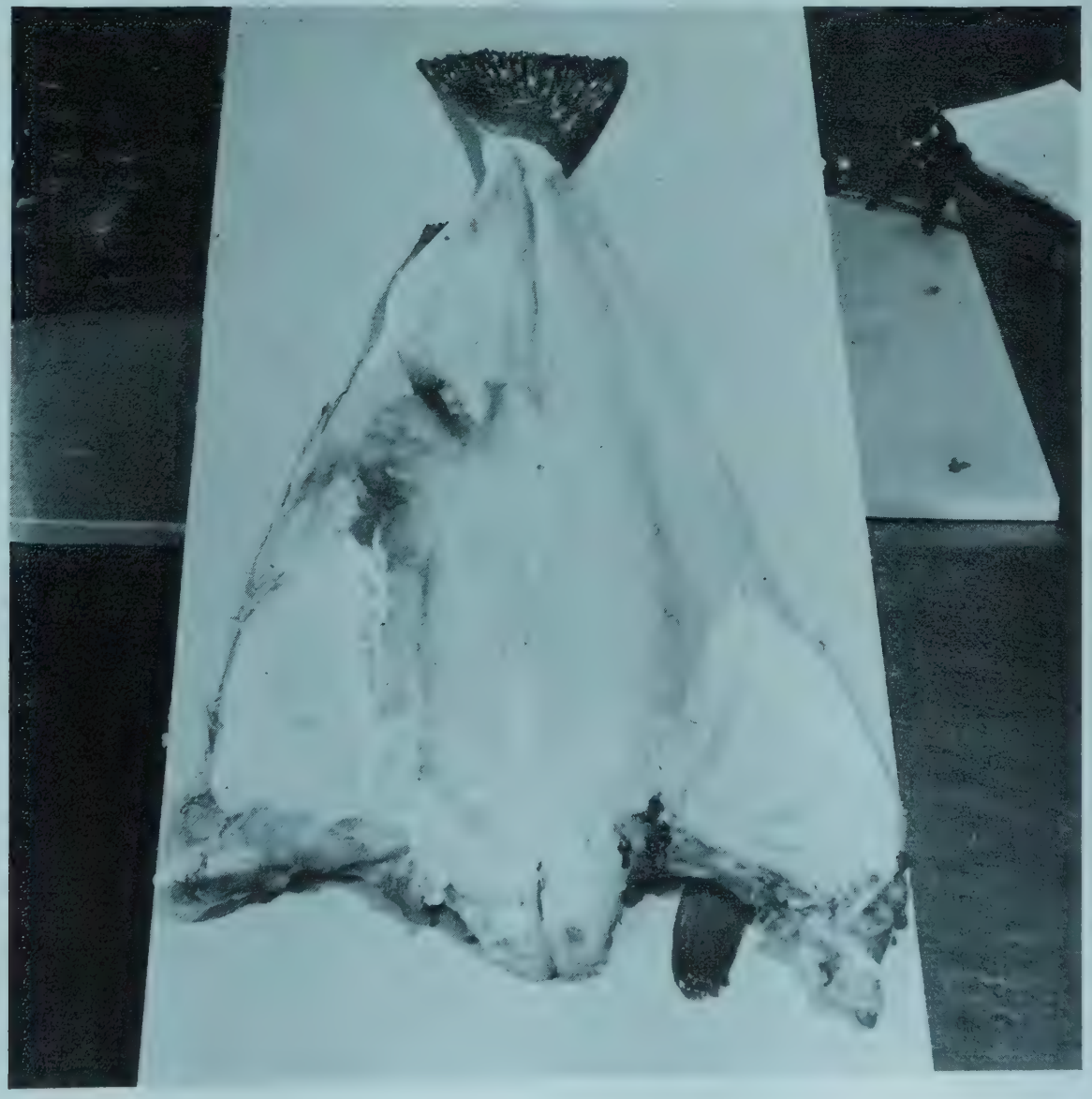
56 Cut down ventral surface to tail.

57 Cut forward alongside backbone and round the outside of the ribs.

58 Turn fish round. Cut forward along backbone following the large blood vessel in the bone.

59 Cut across backbone and then cut forward under the backbone.

60 Part of backbone, complete with ribs, removed.



61 Split fish.

Filleting a deep-bodied bony fish

Tilapia esculenta

Fishes of the family *Cichlidae* which are found in Africa, South America, and Asia, mainly fresh water fishes, but some are found in esturarine or marine environments. *Tilapia esculenta* (Graham), the species illustrated was obtained from Lake Victoria, East Africa.

The head-on single filleting technique used for small round fish, eg. haddock, is used for the slightly deeper bodied *Tilapia* and it presents no problems. If the fillets are to be subsequently skinned, scaling is not necessary, but the scales should be scraped off before filleting if it is intended to market a skin on fillet.

62 Cut from just behind base of pectoral fins to back of head.

63 Cut from head towards tail along the line of the dorsal fin.

64 Cut forward over rib cage to head, cutting through the 'pin' bones.

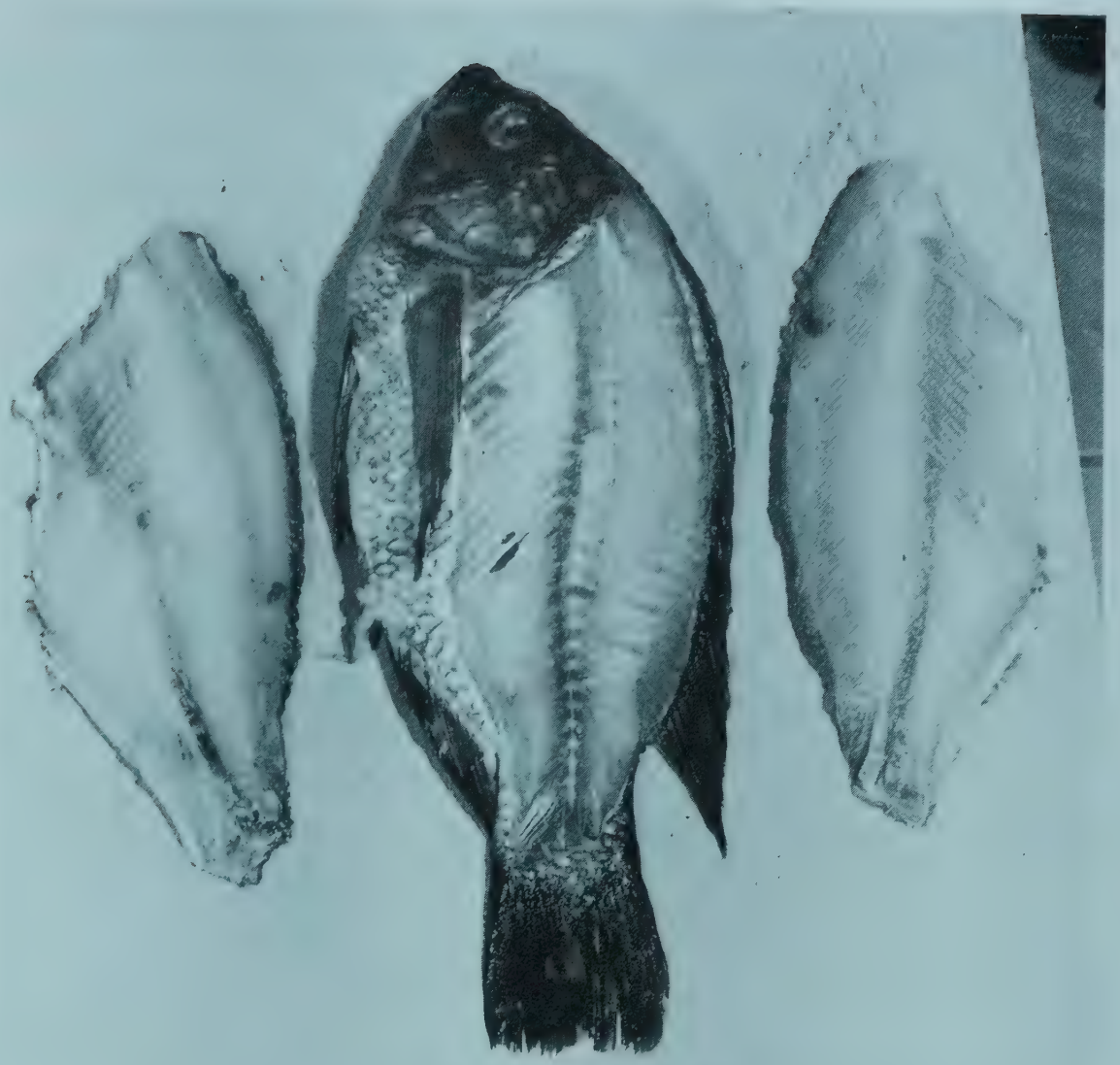
65 Cut from head towards tail, angling knife over the top of the ribs. flatten knife on to backbone as it comes off the ribs and remove fillet. Trim if necessary.

66 Turn fish over. Cut from base of pectoral fin round the back of head.

67 Cut from the tail to the back of the head, keeping the knife close to the dorsal mid-line (dorsal fin).

68 Open out fillet by cutting towards the head keeping the knife close to the ribs. Cut through 'pin' bones.

69 Cut from head towards tail, angle knife over top of ribs, flatten knife as it comes off the ribs and remove fillet. Trim if necessary



70 Fillets and carcase.

Splitting an oily, soft fleshed fish for brining and smoking

Herring: *Clupea harengus*

Herring is a marine pelagic fish which has a high fat content and is soft fleshed. The splitting technique shown is carried out prior to brining and smoking. The split, brined and smoked fish is termed a 'Kipper'. Scales on a herring are very small and thin and scaling is not necessary, a thorough wash in clean water is sufficient.

Herring can be smoked whole, or with the head and long gut removed (nobbing). Gutting can be done by hand, as the photographs show, or by inserting a knife at the gills (gibbing).

Herring – Splitting

71 Insert knife into fish close to dorsal fin and cut forward through head. Keep knife hard against back-bone.

72 Cut from close to dorsal fin to tail.

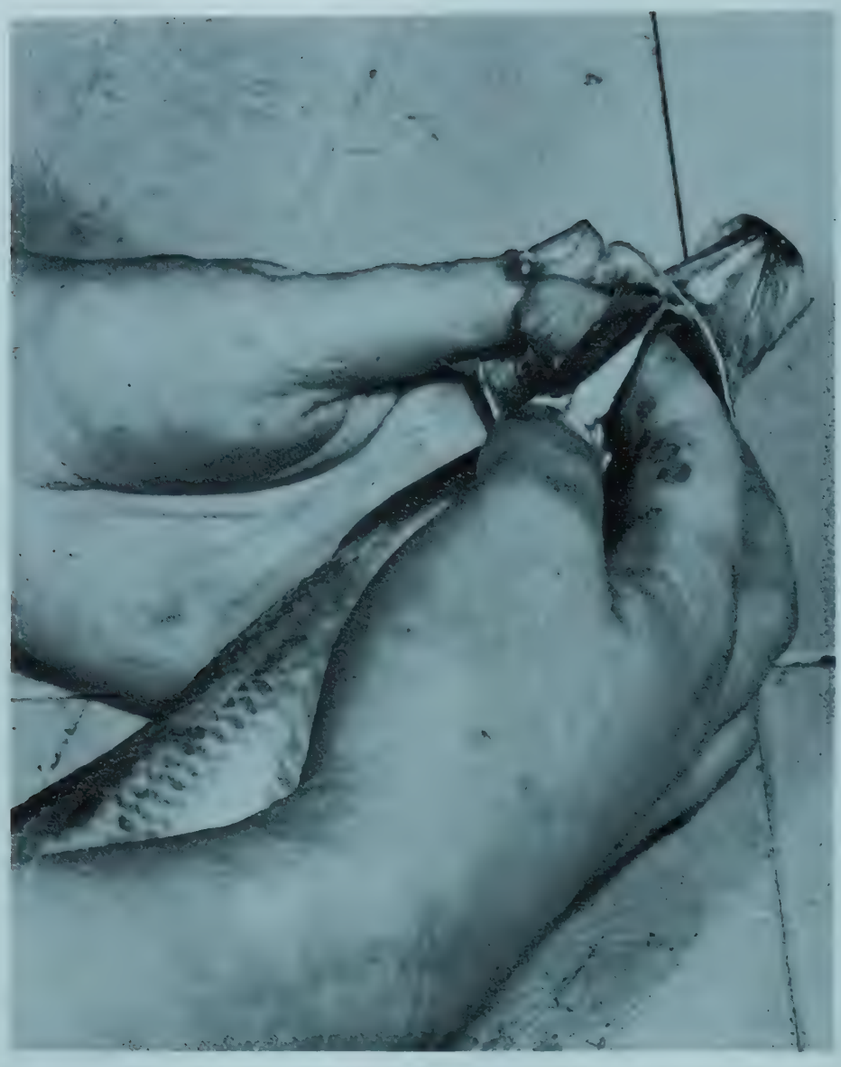
73 Open out fish with knife. Do not cut through skin.

74 Remove guts, gills, heart, brush out peritoneal (black) lining.

75 Clean, washed and split fish.

Herring –
Hand gutting

76 Insert index finger and thumb into each side of the opercular cavity.



77 Push index finger round gills.

78 Break away gill arch support.

79 Insert index finger into body cavity.

80 Break away body wall and remove guts.

81 Gutted and washed herring.

Filleting a bony flat fish

Plaice : *Pleuronectes platessa*

A marine flat fish.

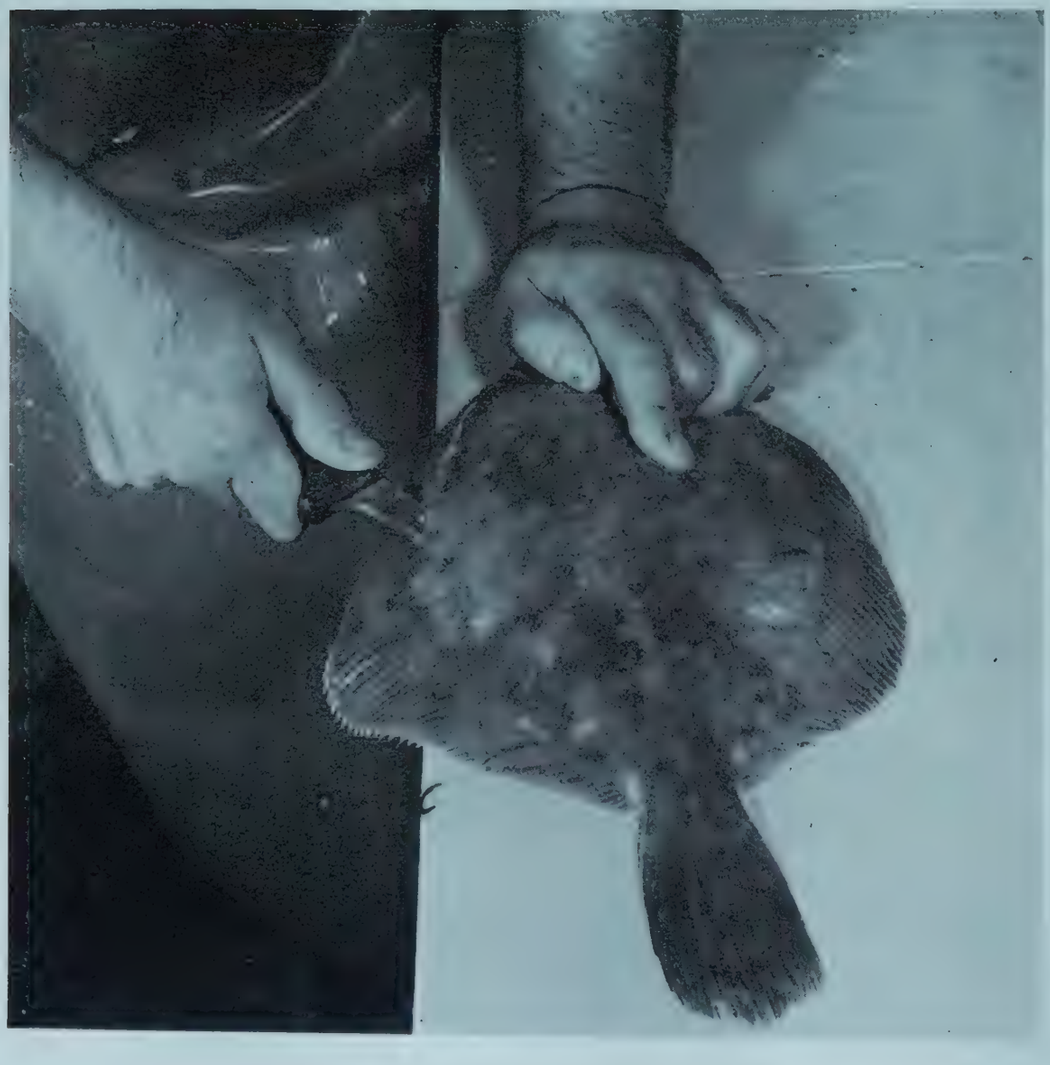
In the northern hemisphere, flat fish are preferred to many of the commoner round-bodied species, and command a very high price.

A cross-cut filleting technique is illustrated where the flesh from each side of the fish is removed in a single piece. If the flesh from each side of the fish is removed in two pieces, it is termed 'quarter-cut filleting'.

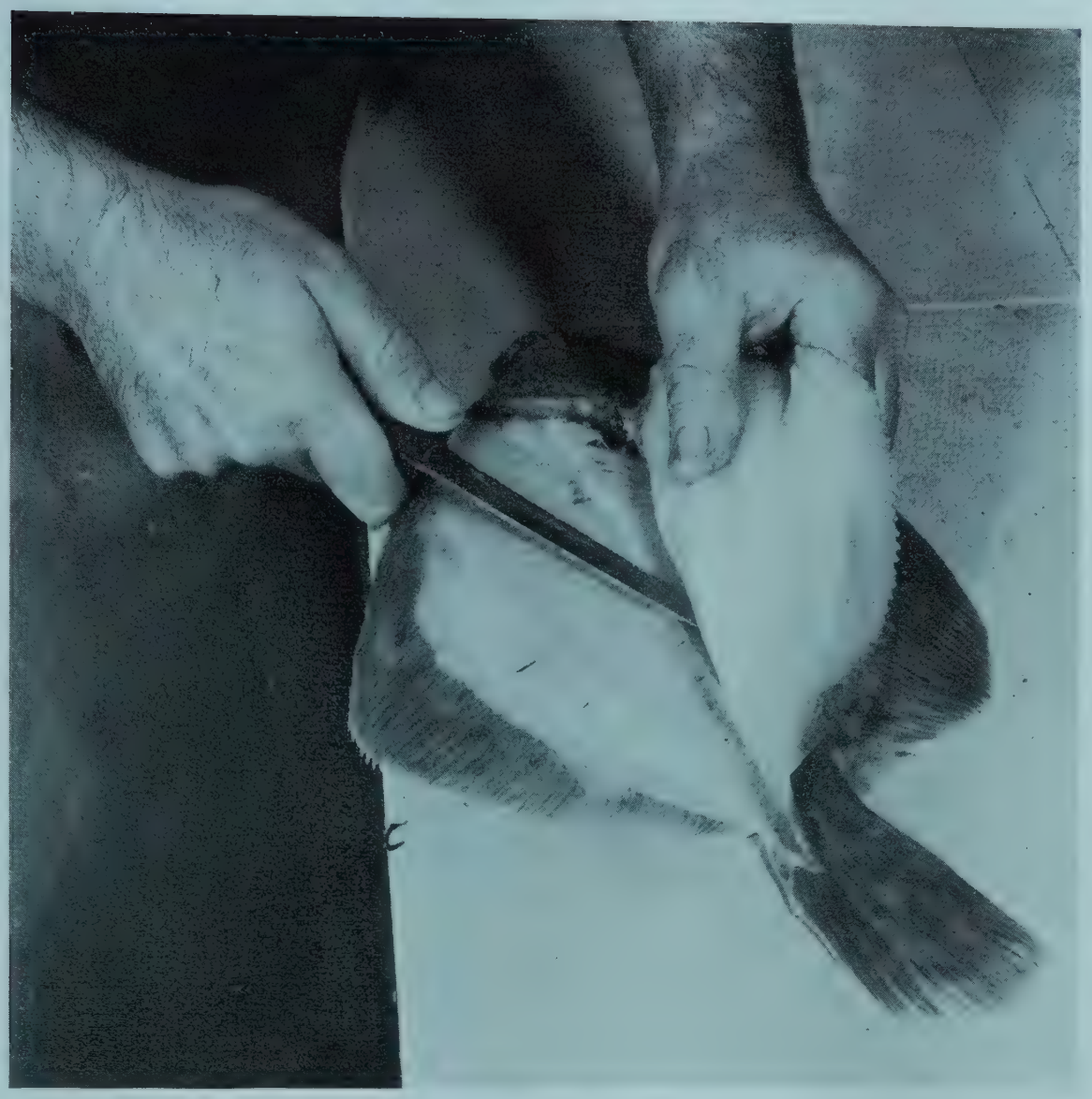
Some species of flat fishes are thinner on the light coloured underside, and it is advisable to remove the light skinned side first.

Filleting

82 Cut round head.



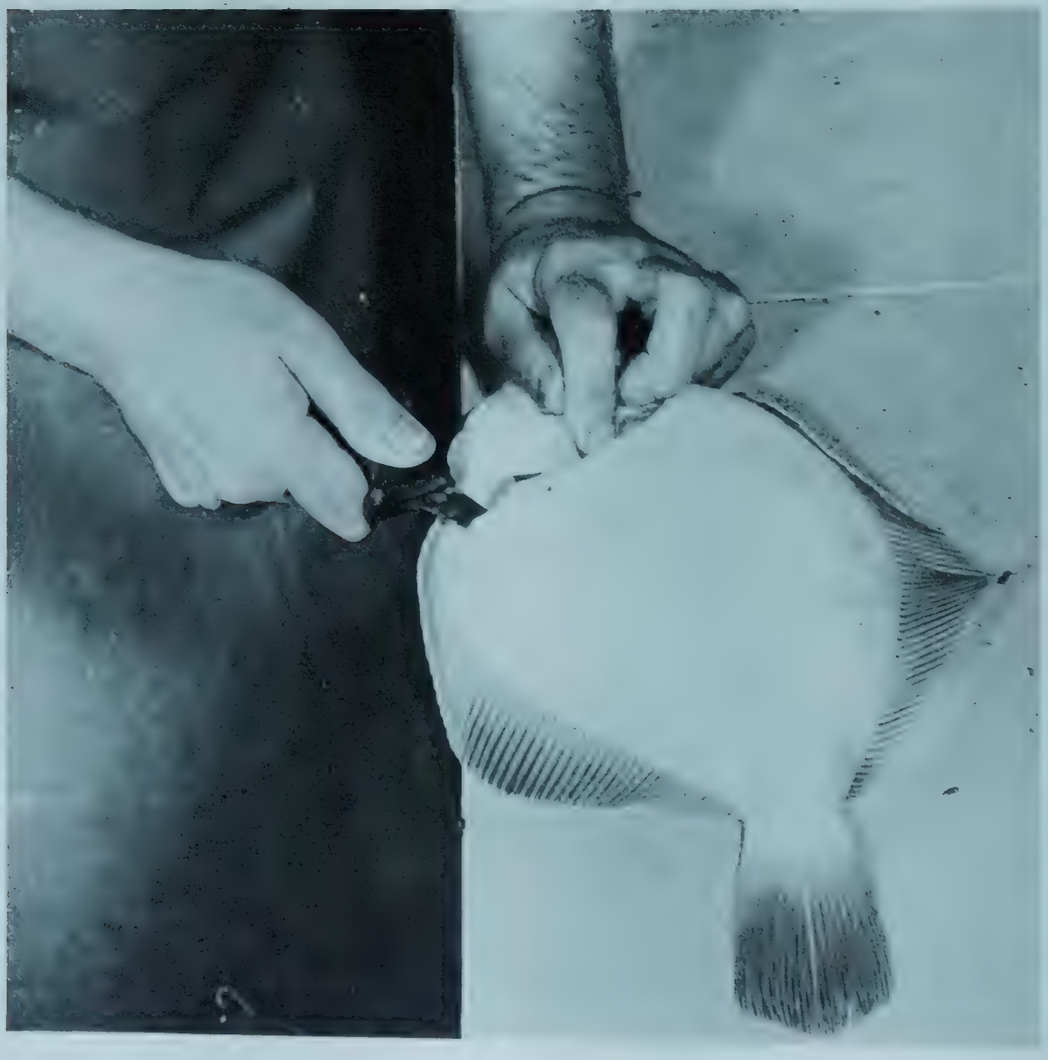
83 Insert knife and cut towards tail, keeping knife flat and as close as possible to the fin.



84 Cut from centre towards head, keeping the point of the knife against the ridge on the backbone.

85 Cut from head towards tail, cutting over the ridge on the backbone and remove fillet. The knife should go through the fish and over the fins to remove the fillet without the fins. Trim if necessary.

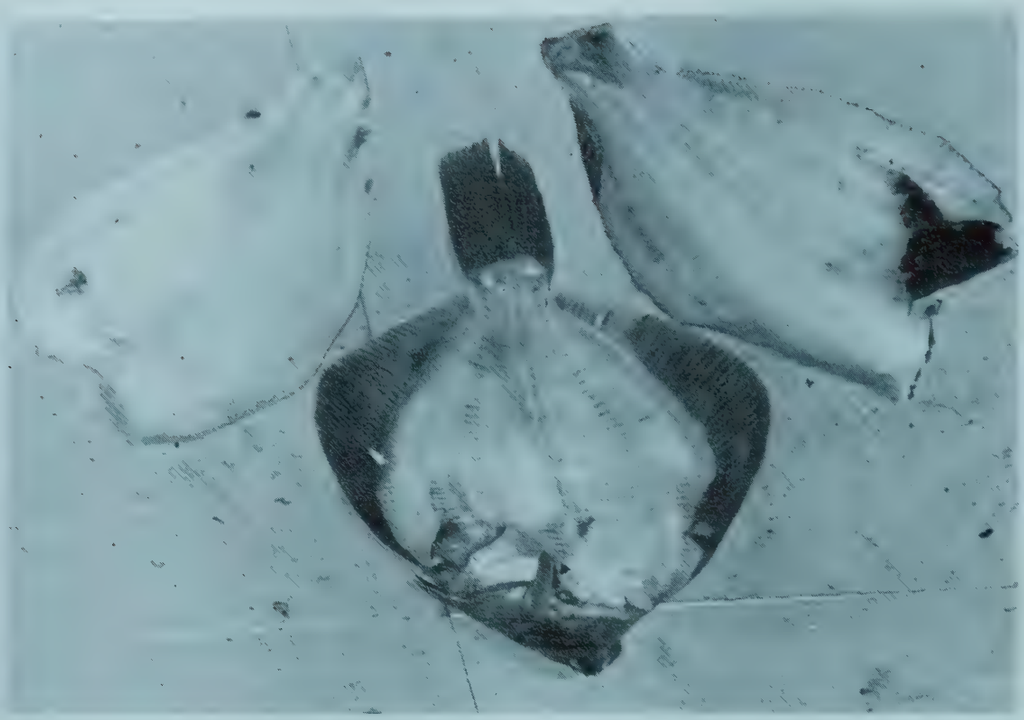
86 Turn fish over. Cut round head.



87 At the end of the cut round the head turn the knife flat and insert into the fish until the point touches the backbone. Keeping the knife flat and close to the fin continue the cut to the tail.

88 Cut from the centre to the head.

89 Cut from the head towards the tail and remove fillet. Trim to remove any fins.



90 The fillets and carcase. Removal of the belly flap is optional.

Preparing a small shark

Spur Dogfish : *Squalus acanthias*

A small species of shark. The fish is not filleted as the backbone and the few other bones in the body are soft. Preparation is limited to the removal of the guts, fins, skin and head. With the dogfish, the skin can be pulled away from the body without damaging the flesh. With other species of shark, even small specimens, it may be impossible to remove the skin from the body without damaging the underlying flesh.

The technique is not applicable to large sharks as the body has to be cut into manageable pieces.

91 Lay fish on side and open by cutting forward from vent along belly. Cut across throat in front of the pectoral fin girdle.

92 Remove all internal organs from the body cavity.

93 Fish opened and gutted. Cut open along the mid-ventral line to beyond the pelvic fins, otherwise the skin is difficult to pull off.

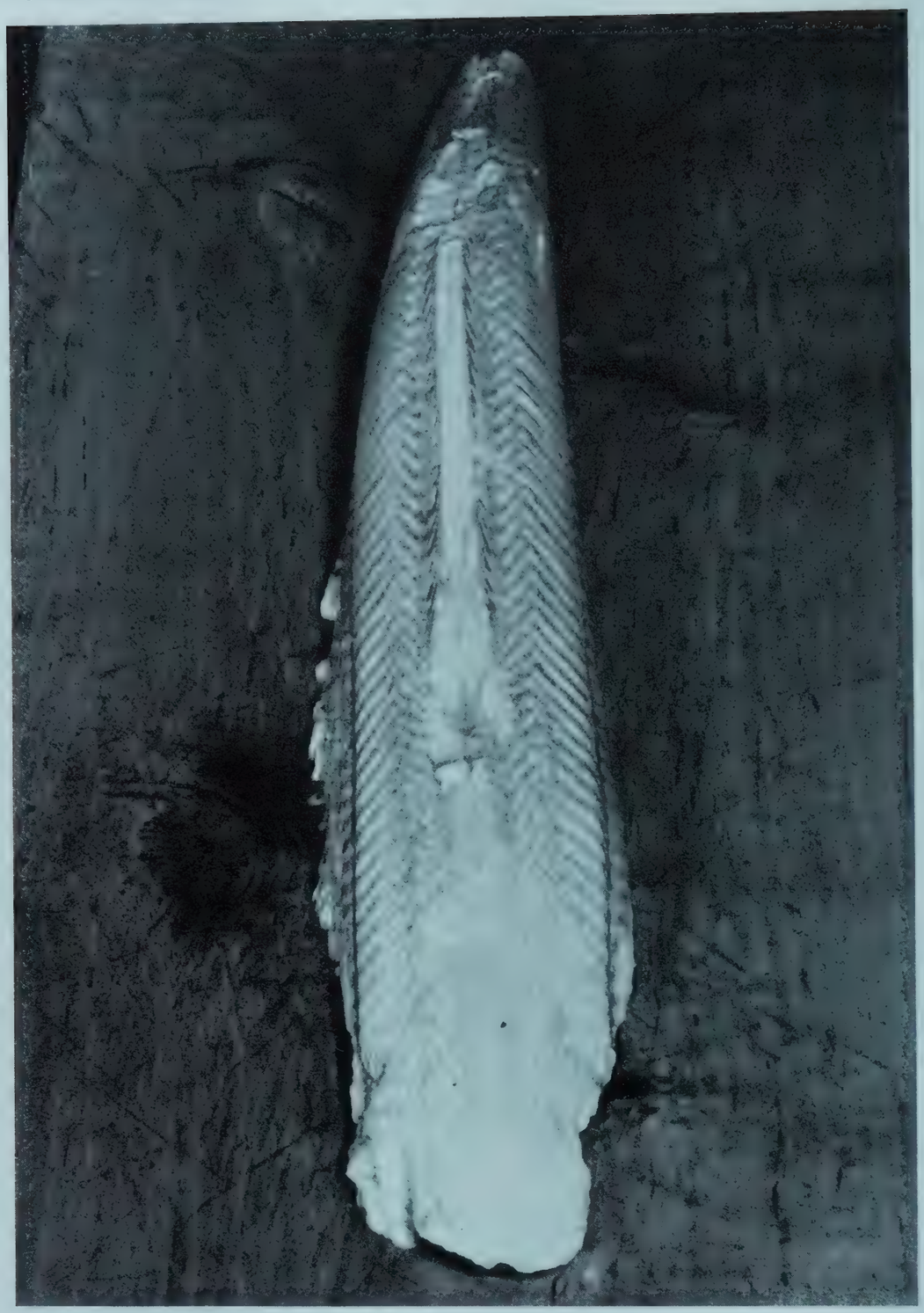
94 Turn fish over and cut off dorsal fins and tail.

95 Fix head of fish firmly on S hook secured to edge of cutting board. Take hold firmly of belly flap and base of pectoral fins and pull up and back.

96 Pull skin towards tail and completely off.

97 Remove from hook and turn round. Cut from dorsal surface behind gills and remove head.

98 Use pliers to remove the small piece of skin remaining.



99 Final product ready for packing.

Preparing a flattened elasmobranch fish

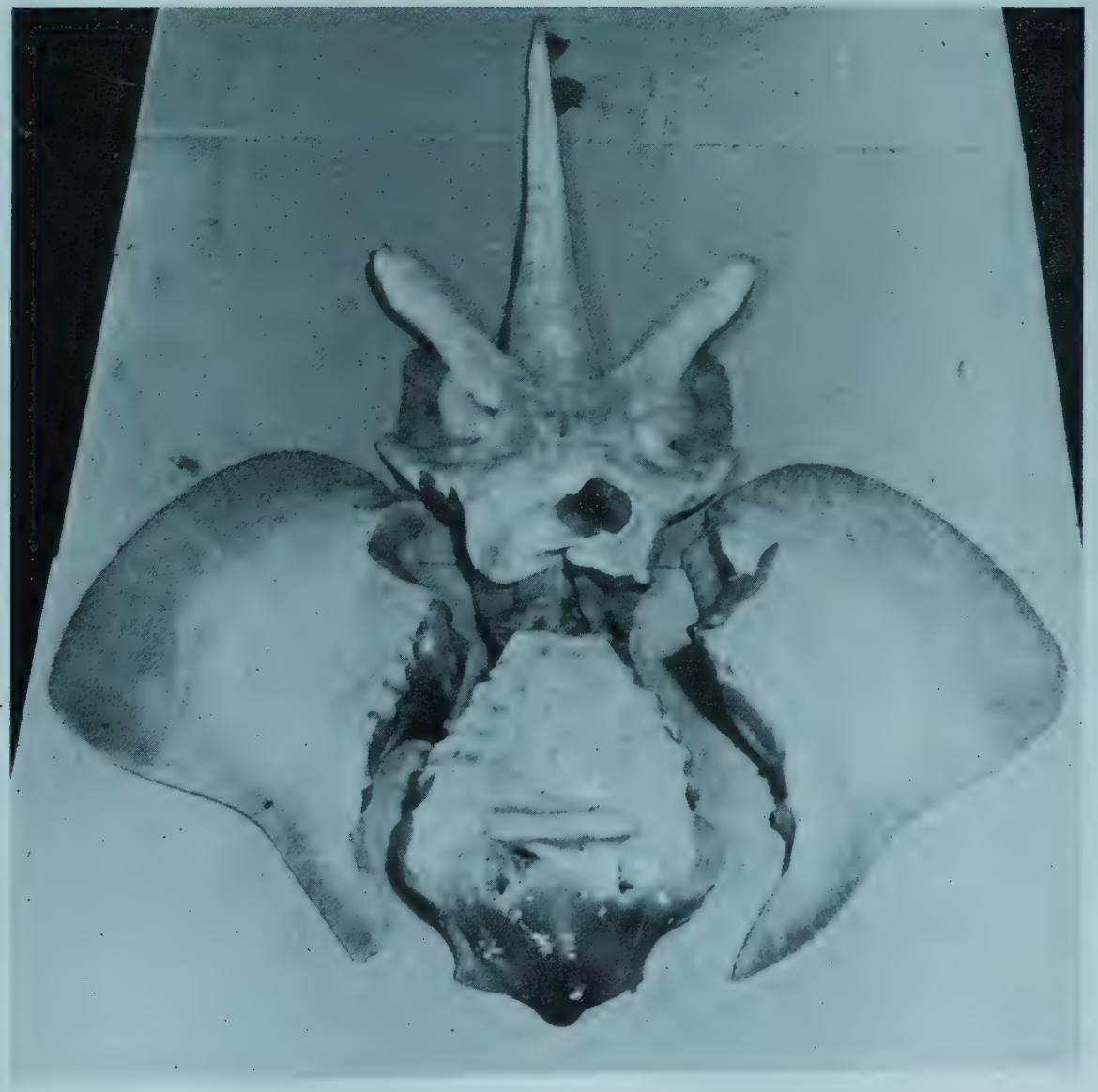
Thornback Ray : *Raja clavata*

A marine dorso-ventrally flattened fish. Rays are not filleted in the strict sense of the word, preparation is limited to the removal of the wings.

100 Lay fish on its back. Cut from front of head round gills.

101 Cut off wing

102 Cut off other wing in exactly same manner.



103 Wings and carcase.

Appendix 1

British suppliers of fish processing equipment

The following list gives names and addresses of some British suppliers of fish processing and ancillary equipment. More detailed lists and information can be obtained from The Tropical Products Institute or The Department of Trade and Industry, Export Service Division, Export House, 50 Ludgate Hill, London, EC4M 7HU.

Chlorinators

APV-Kestner Ltd
Greenhithe
Kent

Chlorination Equipment Ltd
Cannon Lane
Tonbridge
Kent

Chloromet Ltd
Rices Hill
Cantelupe Road
East Grinstead
Sussex

Wallace and Tiernan Ltd
Priory Works
Tonbridge
Kent

Fish Boxes, Containers and Trays

Allibert (UK) Ltd
Berry Hill Industrial Estate
Droitwich
Worcs

Hestair-Sherpa Ltd
Southall Lane
Heston
Middlesex

WCB Containers Ltd
Stamford Works
Bayley Street
Stalybridge
Cheshire SK15 1QQ

Fish Processing Machinery

Afos Ltd
Manor Estate
Anlaby
Yorks

APV Clarke-Built Ltd
Stephenson Way
Thetford
Norfolk

Arenco-Alite Ltd
Pixmore Avenue
Letchworth
Herts SG6 1JR

Fisadco Ltd
Madeley Street
Hull
Yorks

Hart (WJ) & Sons (London) Ltd
212/214 Putney Bridge Road
London SW15

C F Wilson Company (1932) Ltd
116 Constitution Hill
Aberdeen
Scotland

General Suppliers

Stockists of a range of equipment and suppliers to the trade (knives, cutting boards etc.).

Cosalt Ltd
Grimsby
Lincolnshire

Peter Allen & Co Ltd
3 Chalterton Road
Bromley
Kent

Smithfield Refrigerator Co Ltd
High Street
Hornsey
London N8

Ice Plants, Freezing Equipment, Cold Stores

APV Clarke-Built Ltd
Stephenson Way
Thetford
Norfolk

Frigoscandia Ltd
The Granaries
Nelson Street
Kings Lynn
Norfolk

Hall J & E Ltd
Dartford
Kent

Hubbard Engineering Co Ltd
Vancold Works
Martlesham
Suffolk

Jackstone Froster Ltd
Grimsby
Lincolnshire

Nicholls (AS) Ltd
St Cuthberts Street
Bedford

Prestcold Ltd
Theale
Reading
Berkshire

Smith & Partners Ltd
147 Uxbridge Street
Burton-on-Trent
Staffordshire

Ice Crushing Machines

Pertwee & Black Ltd
Nelson Iron Works
South Quay
Great Yarmouth
Norfolk

Insulating Materials

Monsanto Chemicals Ltd
10/18 Victoria Street
London SW1

Protective Clothing

Airguard Ltd
60 Lille Road
London SW6

Ammodon Safety Products Ltd
522 Kingston Road
London SW20

Barbour J & Sons Ltd
Newcastle Road
Simonside
South Shields
Co Durham

The Dunlop Company Ltd
CRG Division
PO Box 151
Cambridge Street
Manchester 1

Johnson & Sons Ltd
Great Yarmouth
Norfolk

John Nayler & Son Ltd
Waddams Pool
Dudley
Worcs

Personnel Protection Ltd
Avalon Works
Bradford Street
Dewsbury
Yorkshire

Protectionwear Ltd
23 Hemsley Road
South Shields
Co Durham

Mark Templeman & Son Ltd
193 Landells Road
East Dulwich
London SE22

Smoking Kilns, Driers, Thawing Equipment

Afos Ltd
Manor Estate
Anlaby
E Yorks

APV Clark-Built Ltd
Stephenson Way
Thetford
Norfolk

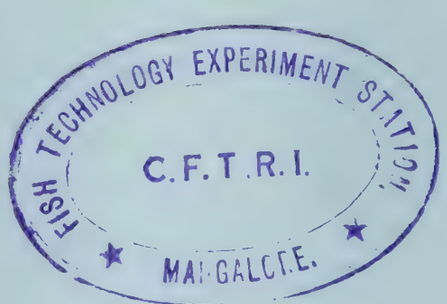
Sterilizants and Detergents

BP Trading Ltd
Detergents Branch
Brittanic House
Moor Lane
London EC3

J K Kontrol Division of Jeyes
52 Wandlebank
London SW19

Soilax Ltd
Yeovil Road
Slough
Bucks

Unilever Export Ltd
Port Sunlight
Cheshire



Appendix 2

Hygiene

Detailed below are outline specifications for buildings in which fish is handled and suggestions for a code of practice that should be followed when handling fish.

1 Where possible, all preparation, processing and packaging should be carried out in one building.

2 Buildings should be single storey, drainage and handling fish is easier on a single level.

3 Floors should be smooth surfaced, but non-slip, well drained and waterproof. As far as is possible, they should be resistant to attack by fish oils, offal and brine. High density concrete containing granite chips can be used although clay tiles are better.

4 The floor surface should be carried up the walls or any permanent fixtures for a height of at least six inches.

5 Floors should slope into the drainage system to facilitate washing down.

6 Drainage channels should be accessible and traps should be installed before discharge into any sewer or soak-away. Traps should be easily and frequently cleaned. Drainage channels should be arranged away from through areas, if not, they should be covered with flush-fitting removeable gratings.

7 Walls should be water-proof and have a smooth surface. Tiles should be used on walls where working tables are against the wall. All other wall surfaces should be painted, preferably with a hard gloss paint.

8 Doors should be flush-fitting and well painted to give a water-proof and washable surface.

9 Windows should be of simple construction with few large sheets of glass and not numerous small sheets.

10 All metalwork should be painted thoroughly to prevent rusting.

11 In tropical countries efficient fly-screening will be essential. All doors and openable windows should be screened. Self-closing screen doors should be fitted at all normal points of entry and exit to and from the working area.

12 Ceilings should have, as far as is possible, a continuous unbroken surface, be painted in a light colour and easily washed. In tropical climates insulation above the ceiling may be required to reduce overheating.

13 Good ventilation is essential and in the tropics all ventilation openings must be screened. In very hot and humid climates an air-conditioning system may be justified. In this case a qualified engineer should be consulted.

14 All equipment must be easy to clean. All work surfaces should be of stainless steel or aluminium alloy. Cutting boards of composition material are preferable, if not, cutting boards of a hard non-resinous wood should be used.

15 Containers for fish and brine should be made from stainless steel, aluminium alloy or a suitable plastic. Wooden fish boxes can be used but they are more difficult to clean.

16 All electrical installations should be properly earthed with waterproof power points. They should be sited well above floor level.

17 A piped supply of clean, drinking quality water should be available. If suitable piped water is not available a filtration/chlorination plant should be installed to treat the raw water supply.

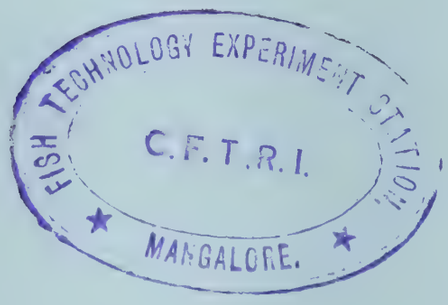
18 A regular cleaning routine must be established for the whole premises to ensure that standards of hygiene are maintained. It is important that adequate supervision is given during cleaning.

19 Detergents and sterilants should be used for cleaning. Detergents help to remove dirt, sterilizers kill bacteria. Many detergents also have some sterilizant properties. A detergent should be used first to remove dirt and then a sterilizer to kill any remaining bacteria. If water chlorination equipment is on site higher levels of chlorine in the water can be used to sterilize. Information on the use of detergents and sterilizers can be obtained from the suppliers listed in appendix 1. (page 68).

20 A piped hot water supply should be available. Detergents are far more effective when used in hot water.

21 High pressure hoses should be used for washing down if possible.

22 Adequate washing, changing and lavatory facilities should be installed, but not in the fish working area. Washing facilities should also be installed in the fish working area.



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